

Nature as Medicine



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*Identifying Research to Bridge the Knowledge-To-Action Gap
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Objective

- To present two arguments for research agendas on *Nature As Medicine*:
 - Nature Therapy to Improve Mental Health
 - Botanicals Research to Improve Human Health

Nature As Medicine for Mental Health

- A pandemic of poor mental health among students
 - In 2020, 87% reported that their mental health has been negatively impacted by the pandemic
 - In 2021, academic success was reduced by 22% due to depression, and about 38% due to stress
 - Solutions? Counseling, workshops, medications, and hospitalizations (due to increased risk of suicide)
 - How about nature therapy?
- Nature Therapy
 - Nature-based interventions and immersion in natural settings to prevent or alleviate symptoms of mental and physical illnesses.

American College Health Assessment 2022; Jafari M, De Roche M, Eshaghi M. Journal of American College Health 2021; Genevieve RM et al. Frontiers in Psychology 2019. Ibes DC and Forestell CA. Journal of American College Health 2022, www.campusnature.com,

Campus Nature Rx Network and Life101 Nature Therapy



- Campus Nature Rx (CNRx) Network

- Cornell, UC Davis, U. Minnesota, William & Mary– the network is now a coalition of over 50 U.S. colleges and universities (www.campusnature.com)
- Scientific evidence that Nature Rx courses improve the mental health of students
- Nature Therapy “Dose”: 10–20 min of sitting or walking in natural settings

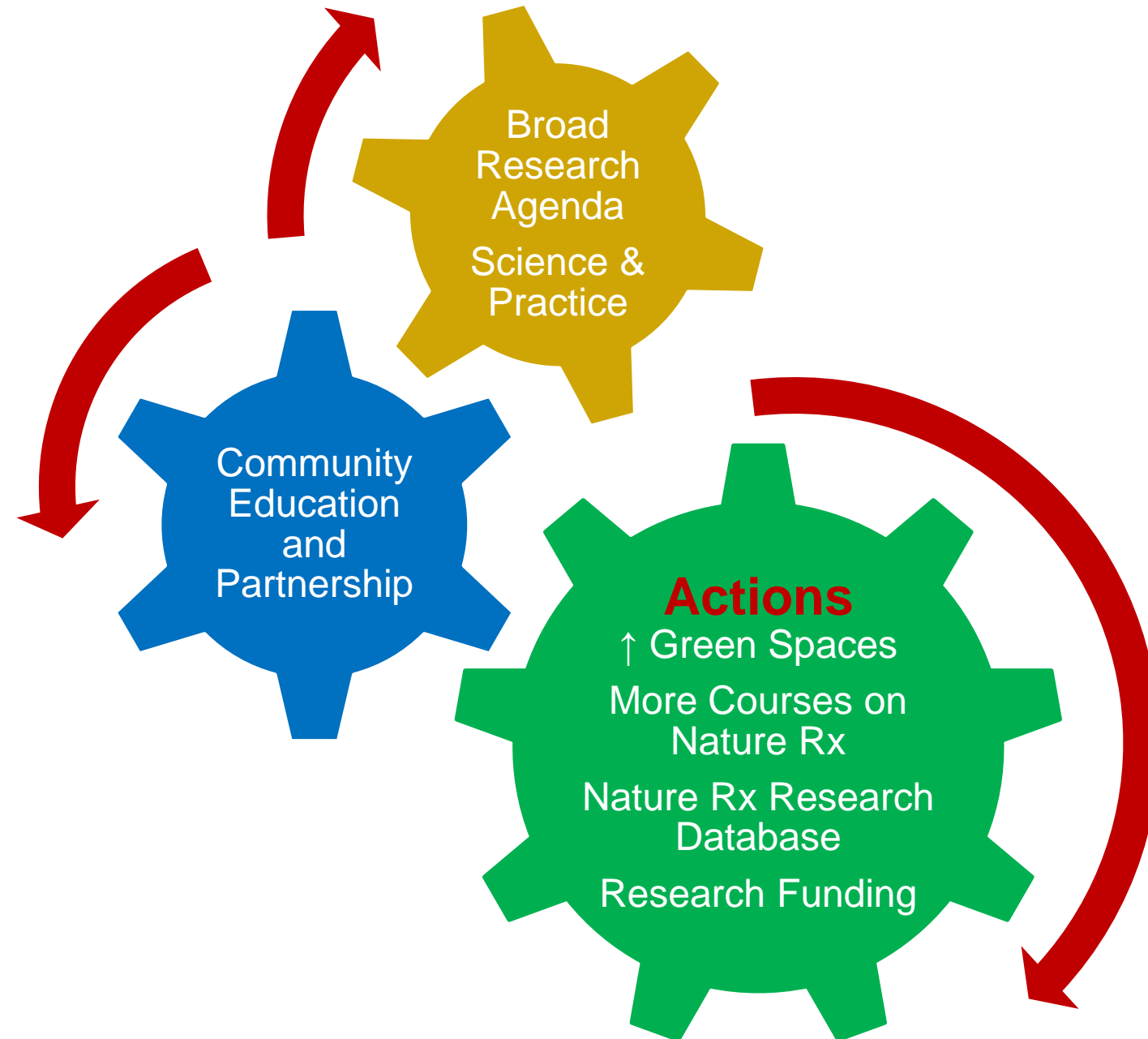
- At UCI: Life101- Mental and Physical Self-Care (taught on all 10 UC campuses and on www.coursera.com)

- Nature Therapy Module (teaching the science and practice of nature therapy)
- Pre- and Post-Course Surveys
- Majority of students did not even know what nature therapy is
- **107%** increase in the practice of nature therapy weekly (2020-21 in ~2000 students)



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Nature Therapy to Improve Mental Health

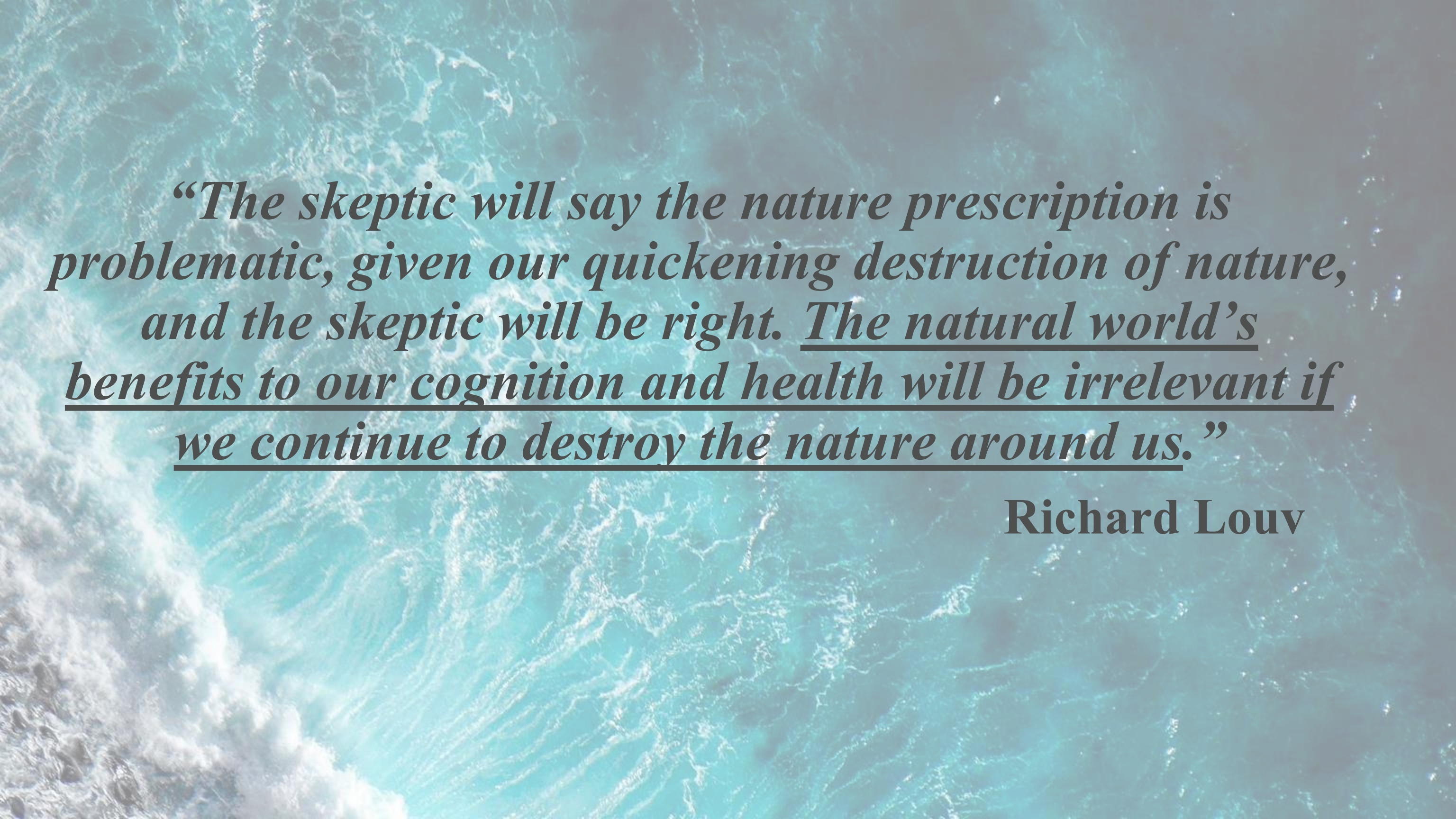


Nature Therapy Stations



Citizen Science





“The skeptic will say the nature prescription is problematic, given our quickening destruction of nature, and the skeptic will be right. The natural world’s benefits to our cognition and health will be irrelevant if we continue to destroy the nature around us.”

Richard Louv

Botanicals to Improve Human Health

- Nature is a source of medicinal plants
 - Many FDA-approved pharmaceutical drugs came from plants
 - Plants used in traditional medical practices and as botanical supplements
- FDA does not have the same regulatory authority over botanical dietary supplements as it does for pharmaceutical drugs
 - “The U.S. FDA does not have the authority to review dietary supplement products for safety and effectiveness before they are marketed.”

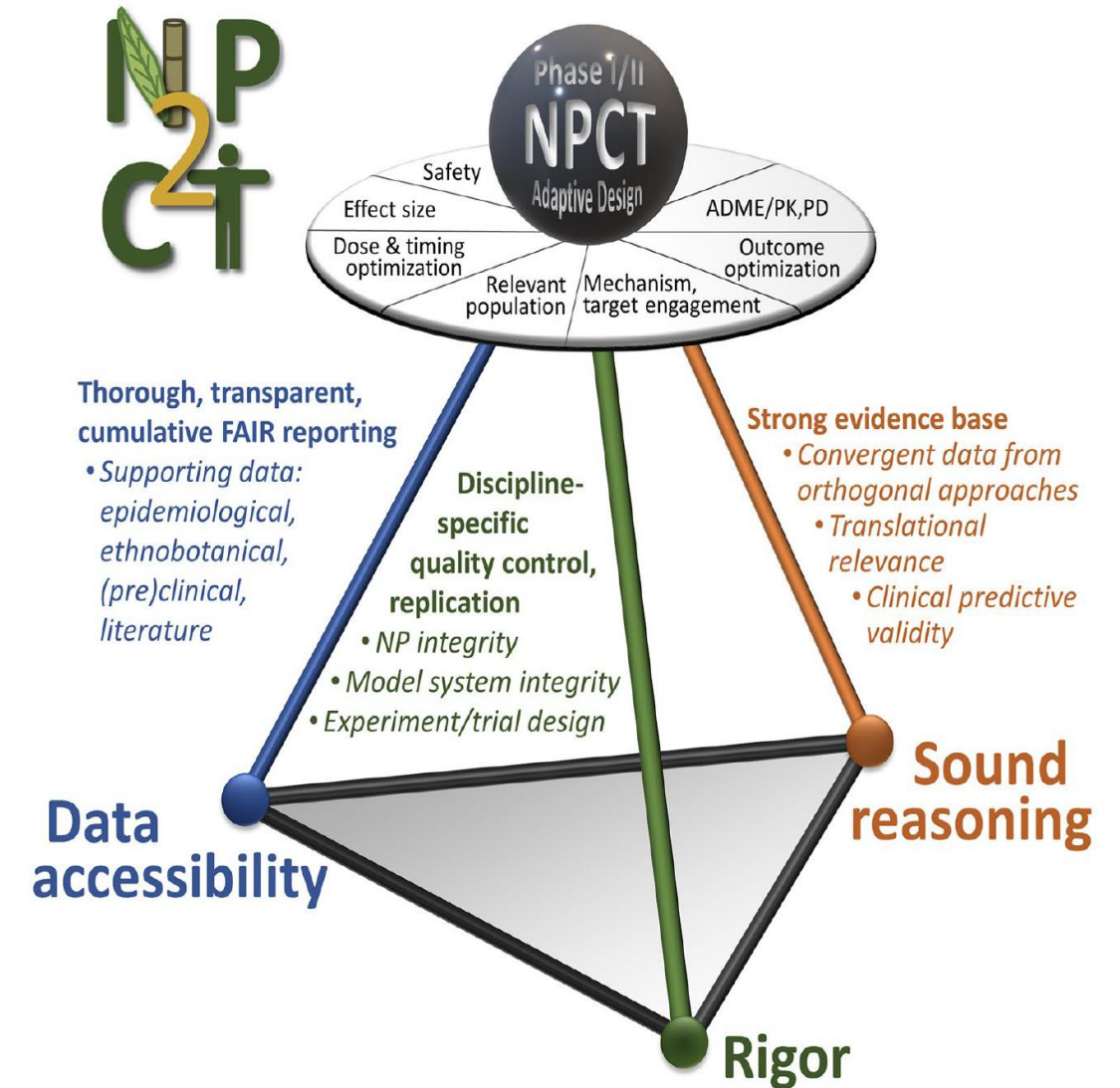
Drugs	Action/ Clinical use	Species
Acetyl digoxin	Cardiotonic	<i>Digitalis lanata</i>
Allyl isothiocyanate	Rubefacient	<i>Brassica nigra</i>
Atropine	Anticholinergic	<i>Atropa belladonna</i>
Berberine	Bacillary dysentery	<i>Berberis vulgaris</i>
Codeine	Analgesic, antitussive	<i>Papaver somniferum</i>
Danthron	Laxative	<i>Cassia spp.</i>
L-Dopa	Anti-Parkinson's	<i>Mucuna spp.</i>
Digitoxin	Cardiotonic	<i>Digitalis purpurea</i>
Ephedrine	Antihistamine	<i>Ephedra sinica</i>
Galanthamine	Cholinesterase inhibitor	<i>Lycorissqua migera</i>
Kawain	Tranquilizer	<i>Piper methysticum</i>
Lapachol	Anticancer, antitumor	<i>Tabebuia spp.</i>
Ouabain	Cardiotonic	<i>Strophantus gratus</i>
Quinine	Antimalarial	<i>Cinchona ledgeriana</i>
Salicin	Analgesic	<i>Salix alba</i>
Taxol	Antitumor	<i>Taxus baccata/ T. wallichiana</i>
Vasicine	Cerebral stimulant	<i>Vinca minor</i>

Sharma M. Plant Archives. 2020

Jafari M. The Truth About Dietary Supplements: An Evidence-Based Guide to a Safe Medicine Cabinet. Archangel/Amazon, 2021

Botanical Research

- A need for high quality and high impact
- Often, preclinical botanical research does not translate into positive clinical trial outcomes
 - Importance of high-quality research at all levels
- Importance of training the scientists for rigorous research on botanicals

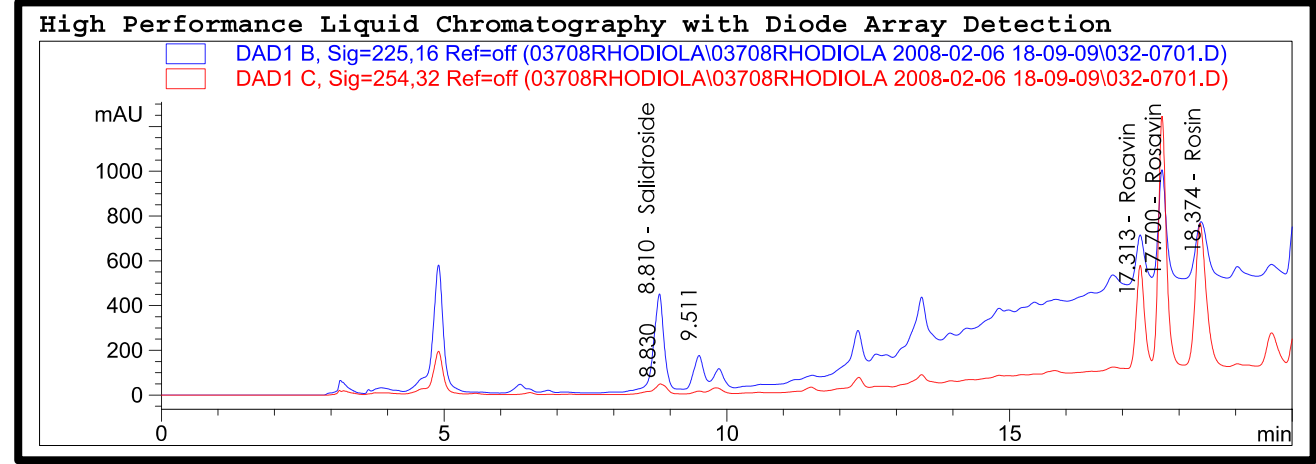


Sorkin B et al. FASEB 2019.

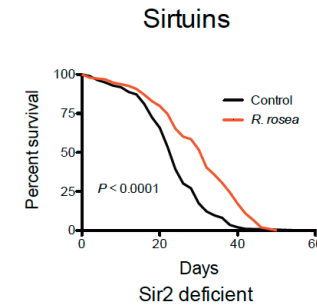
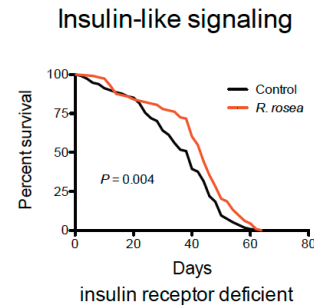
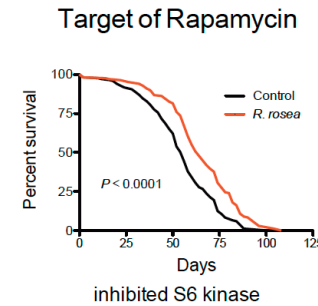
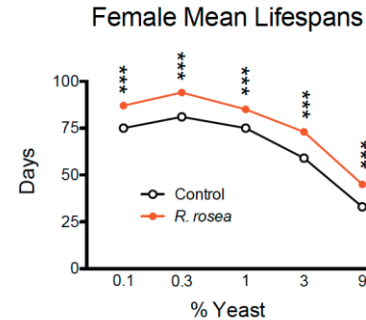
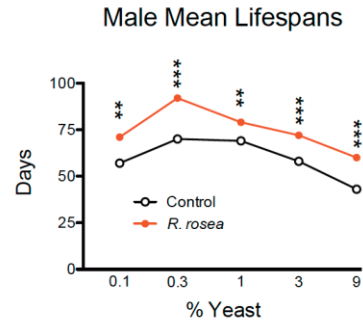
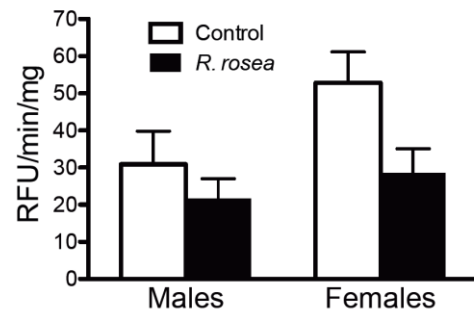
Rhodiola rosea



- Grows in arctic and dry regions
- Siberia (and now Alaska)
- Used in traditional medical practices for thousands of years for a variety of indications

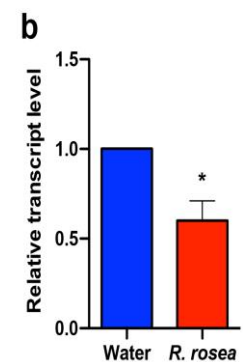
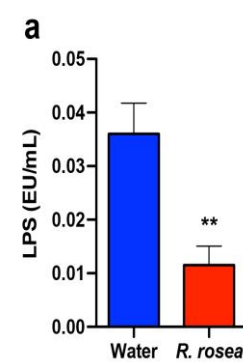
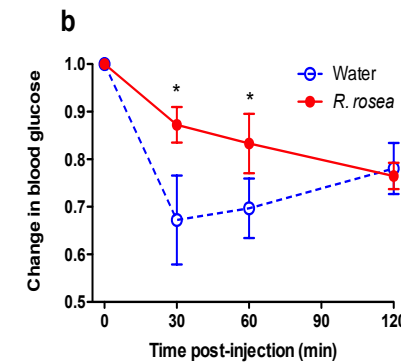


- Fruit Flies: Increased lifespan and improved healthspan plus mechanistic studies



- Leptin Deficient Mice: Improved biomarkers of diabetes inflammation and modulated microbiome

- A future clinical study in type 2 diabetes



Schriner SE et al. PloSONE 2013. Jafari M. Rej Research 2017. Jafari M et al. Scientific Reports 2022.

Rhodiola rosea farming in Alaska

- Climate change is negatively impacting natural and agricultural ecosystems
- Arctic ecosystems are experiencing some of the most rapid changes
- The potential impact of climate change on farming *Rhodiola rosea* in Alaska



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Botanical Research to Improve Human Health



Thank you.

